UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 162 TO FACILITY OPERATING LICENSE NO. DPR-23

CAROLINA POWER & LIGHT COMPANY

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

DOCKET NO. 50-261

1.0 INTRODUCTION

On June 25, 1990, the Nuclear Regulatory Commission (NRC) issued Generic Letter (GL) 90-06, "Resolution of Generic Issue 70, 'Power-Operated Relief Valve and Block Valve Reliability,' and Generic Issue 94, 'Additional Low-Temperature Overpressure Protection for Light-Water Reactors,' Pursuant to 10 CFR 50.54(f)." The GL represented the technical resolution of the above-mentioned generic issues.

Generic Issue 70, "Power-Operated Relief Valve and Block Valve Reliability," involves the evaluation of the reliability of power-operated relief valves (PORVs) and block valves and their safety significance in pressurized water reactor (PWR) plants. The GL discussed how PORVs are increasingly being relied upon to perform safety-related functions and the corresponding need to improve the reliability of both PORVs and their associated block valves. Proposed NRC positions and improvements to the plant's Technical Specifications (TS) were recommended to be implemented at all affected facilities. This issue is applicable to all Westinghouse, Babcock & Wilcox, and Combustion Engineering designed facilities with PORVs.

Generic Issue 94, "Additional Low-Temperature Overpressure Protection for Light-Water Reactors," addresses concerns with the implementation of the requirements set forth in the resolution of Unresolved Safety Issue (USI) A-26, "Reactor Vessel Pressure Transient Protection (Overpressure Protection)." The GL discussed the continuing occurrence of overpressure events and the need to further restrict the allowed outage time for a low-temperature overpressure protection channel in operating modes 4, 5, and 6. This issue is only applicable to Westinghouse and Combustion Engineering facilities.

By letter dated June 18, 1992, as supplemented December 8, 1992, and February 3, 1995, Carolina Power & Light Company (the licensee) requested changes to the TS for the H. B. Robinson Steam Electric Plant, Unit No. 2 (HBR). The requested changes would add limiting conditions for operation (LCOs) and surveillance requirements for the pressurizer PORVs and their associated block valves whenever average temperature is above 350 degrees F or the reactor is critical. Proposed TS will also be added for low-temperature overpressure protection (LTOP) whenever average temperature is less than 350 degrees F and the reactor coolant system (RCS) is not vented to the

containment. The December 8, 1992, letter corrected a typographical error and did not affect the no significant hazards consideration determination. The licensee's letter dated February 3, 1995, proposed a revision to the TS regarding block valve testing in accordance with the GL recommendations.

2.0 EVALUATION

2.1 Generic Issue 70

The actions proposed by the NRC to improve the reliability of PORVs and block valves represent a substantial increase in overall protection of the public health and safety and a determination has been made that the attendant costs are justified in view of this increased protection. The technical findings and the regulatory analysis related to Generic Issue 70 are discussed in NUREG-1316, "Technical Findings and Regulatory Analysis Related to Generic Issue 70 - Evaluation of Power-Operated Relief Valve Reliability in PWR Nuclear Power Plants."

With the exception of the following variations, the proposed changes to the HBR TS are consistent with the guidance of GL 90-06.

2.1.1 Hot Standby

The licensee proposed specification wording in a format consistent with the HBR operating condition definitions for the range of conditions as defined in the Standard Technical Specifications (STS), because the HBR specifications do not define a hot standby condition. The STS defines hot standby as a reactivity less than 0.99, 0 percent rated thermal power and Tavg greater than or equal to 350 degrees F. The STS definition for hot shutdown is the same as for hot standby, except that Tavg is less than 350 degrees F and greater than 200 degrees F. In the HBR TS, hot shutdown is defined as when the reactor is subcritical and Tavg is greater than 200 degrees F. Based on the HBR definitions, the STS hot standby condition would be represented by the reactor being subcritical and Tavg greater than or equal to 350 degrees F. The STS hot shutdown condition, as represented by the HBR definitions, would be that the reactor is subcritical with a Tavg less than 350 degrees F. The HBR plant/reactor conditions are the same conditions as represented by the STS, and are, thus, acceptable to the NRC staff.

2.1.2 PORV Block Valve Inoperability

The licensee has deviated from the GL with respect to PORV block valve inoperability due to normal or emergency power source inoperability. Because the PORVs and block valves were not originally designed as safety-related components at HBR, the power for both PORV block valves is supplied from the same power source, emergency bus E-2. The 4-kV bus 3 powers emergency bus E-2, and its emergency power is from the "B" emergency diesel generator (EDG). The existing TS 3.7.2.d allows power operation to continue for up to 7 days while the "B" EDG is inoperable, to accommodate corrective or preventive maintenance on the EDG. The existing TS 3.7.2.a, b and c also provide LCO for

the loss of all normal power sources which vary from 24 hours to indefinite operation, depending on the nature of the loss of the power source. If the GL model TS 3.4.4.d were applied at HBR and both block valves were determined inoperable by TS 1.3 due to an inoperable common normal or emergency power source, the 7-day (or longer) LCO would be effectively shortened to 72 hours. The NRC staff agrees that an exception for loss of normal or emergency power in this case (footnote 1 to TS 3.1.1.5) eliminates an unnecessary thermal cycle on the plant, and, therefore, finds the change acceptable.

2.1.3 PORV Through-Leakage

The current HBR TS do not provide an acceptable value for leakage from a PORV. However, actions to be taken can be related to TS 3.1.5.2 for RCS leakage. A block valve can be closed to assist in the identification of a leak location, and, thereby, PORV seat leakage would be identified. Continued operation would be safe because the block valve could be closed to isolate the leak, and continued operation with leakage less than or equal to 10 gallons per minute (gpm) would be permitted by TS 3.1.5.2. For any nonisolable leakage exceeding 10 gpm, TS 3.1.5.2 requires the plant to go to hot shutdown within 12 hours using normal operating procedures. To address RCS leakage through a PORV consistently with other nonisolable RCS leakage, the new specification 3.1.1.5.a should also provide 12 hours to achieve hot shutdown. For consistency relative to PORV inoperability, TS 3.1.1.5.b and c should also allow 12 hours to reach hot shutdown. The NRC agrees with this change, because it meets the intent of the GL.

2.1.4 Isolation of PORVs

The practice at HBR has been to isolate a leaking PORV before reaching the limits of TS 3.1.5.2 to preclude degradation of the valve seat. This practice has shown that the PORV damage from leakage can be limited thereby avoiding the need for major valve rework or replacement. The NRC guidance allows power operation to continue only if the block valves were shut after the excessive leakage threshold had been exceeded. The licensee has included the discretionary isolation of a leaking PORV in TS 3.1.1.5.b and c, consistent with TS 3.1.1.5.a. This change is acceptable as it is consistent with the GL.

2.1.5 Degassing prior to Hot Shutdown

NRC guidance provides 6 hours for achieving hot shutdown subsequent to being in hot standby. For proposed TS 3.1.1.5, the licensee states that HBR needs 12 hours to achieve hot shutdown. Should a PORV or block valve inoperability require the RCS to be opened, the system must be degassed (i.e., hydrogen and other volatile gases must be removed). This gas removal process is performed more efficiently at higher temperatures (Tavg greater than 350 degrees F) and pressures. The degassing process requires more than 12 hours to effectively achieve a hydrogen concentration of less than the 5 cc/kg limit. The 6-hour period specified in the NRC guidance for cooling down to 350 degrees F would relegate a considerable portion of the degassing process to those lower-temperature, lower-pressure conditions and could effectively delay the start of valve maintenance. By completing degassing at higher temperatures, the

system is ready for entry more quickly upon shutdown; maintenance can be commenced more quickly, hence, reducing the time required to put the system back in service. This additional time for degassing is acceptable to the NRC staff, because it allows for safer operation.

2.1.6 Entry into an Operational Condition

The STS provide a specification which precludes entry into an operational condition until all LCO are met without reliance on an associated action statement. Exceptions to this specification are allowed as stated in the individual TS. For PORVs, the NRC allows that exception. The standard specification for precluding entry into an operating condition is STS 3.0.4 and is stated as follows:

> Entry into an OPERATIONAL MODE or other specified condition shall not be made unless the conditions for the LCO are met without reliance on provisions contained in the ACTION requirements. This provision shall not prevent passage through or to OPERATIONAL MODES as required to comply with ACTION requirements. Exceptions to these requirements are stated in the individual specifications.

Since the HBR TS has no statement comparable to STS 3.0.4, the NRC accepts the wording the licensee has proposed in TS 3.1.1.5.e:

> For this specification, reactor start-up, heatup and entry into operational conditions with Tavg greater than or equal to 350 degrees F may continue so long as the limits of associated action statements are met.

2.1.7 Proposed Surveillance Testing

Proposed TS 3.1.1.5.f would allow performance of certain surveillance testing of the PORVs and block valves without declaring the associated valve train inoperable. Due to the short duration of the surveillance tests performed and the plant conditions under which the tests are performed, the probability of an event occurring during the test is very low. Further, with only one valve train allowed out of service at a time and its redundant train available, overpressure protection remains available during the testing. The NRC finds this acceptable as a plant specific alternative.

2.1.8 Testing of Block Valves

In the initial amendment request dated June 18, 1992, the licensee indicated that testing of the block valve, when isolated for pressure boundary protection control, could challenge the plant protective systems by causing a decrease in system pressure and could exacerbate the excessive leakage. Following a discussion to clarify the NRC position, the licensee submitted a revised amendment request in a letter dated February 3, 1995. The licensee agreed with the GL that assurance of the block valve operability outweighs potential risks associated with isolating a pressurizer PORV with excessive seat leakage during surveillance.

The capability to cycle block valves is needed for several accident mitigation strategies, such as "feed-and-bleed" of the RCS in case of a total loss of main and auxiliary feedwater. The licensee, however, in adopting the NRC's position with respect to testing block valves associated with isolated leaking PORVs has requested that additional wording be added to the TS to characterize the nature of the leakage. A pressurizer PORV would be defined as "leaking" with up to and including 1 gallon per minute (gpm) of seat leakage, but would not be inoperable. "Excessive" leakage is defined by the licensee as greater than 1 gpm up to and including 10 gpm. In the case of excessive seat leakage, as proposed in TS 3.1.1.5.a, power operation may continue with excessive leakage through the pressurizer PORV with the associated block valve closed provided block valve surveillance testing continues on a 92-day interval as proposed in TS 4.2.4.2. With pressurizer PORV leakage exceeding 10 gpm, the pressurizer PORV is considered inoperable and block valve surveillance testing would not be required. The NRC agrees with the licensee's proposed TS changes; the block valve is not required to be cycled when isolating an inoperable PORV.

The NRC has reviewed the licensee's proposed changes to the HBR TS as described above. The proposed changes will ensure that HBR satisfies the intent of GL 90-06, which is to enhance the reliability of PORVs and block valves. Since the proposed modifications are consistent with the NRC's position previously stated in GL 90-06 or found to be acceptably justified, the NRC finds the proposed modifications to be acceptable.

2.2 Generic Issue 94

The actions proposed by the NRC to improve the availability of the LTOP system represents a substantial increase in the overall protection of the public health and safety and a determination has been made that the attendant costs are justified in view of this increased protection. The technical findings and the regulatory analysis related to Generic Issue 94 are discussed in NUREG-1326, "Regulatory Analysis for the Resolution of Generic Issue 94, Additional Low-Temperature Overpressure Protection for Light-Water Reactors."

The proposed changes to the HBR TS reduce the allowed out-of-service time for the PORVs from 7 days to 72 hours. More explicit surveillance requirements are also provided. With the exception of the following variations, the proposed changes to the HBR TS are consistent with GL 90-06.

2.2.1 Cooldown Rates

For TS 3.1.2.1, the licensee states that 12 hours are needed to depressurize and vent the RCS versus 8 hours proposed by the modified TS, Section 3.4.9.3 recommended in the GL. In order that the reactor cooldown rate not exceed that allowed by the TS cooldown curves, the general procedure GP-007, "PLANT COOLDOWN FROM HOT SHUTDOWN TO COLD SHUTDOWN," provides the following guidance in a note prior to the steps initiating cooldown:

Do not exceed the cooldown limitations set below:

350°F to 300°F	60°F/hour maximum
300°F to 250°F	30°F/hour maximum
250°F to 200°F	15°F/hour maximum
200°F to 170°F	10°F/hour maximum
less than 170°F	3°F/hour maximum

Using this guidance, a cooldown from 350 degrees F to 200 degrees F requires a minimum of 6 hours. Based on the need to warm up the residual heat removal system to take the plant to cold shutdown and potential for delays in adjusting cooldown rates, the licensee requested an additional 4 hours for this LCO. The NRC has reviewed the request and finds the additional 4 hours is justified and the change is, therefore, acceptable.

2.2.2 Overpressure Protection System Inoperability

A deviation from the GL guidance to consider the overpressure protection system inoperable due to inoperability of the emergency power source has been included in the proposed TS 3.1.2.1. The NRC finds this deviation acceptable and consistent with TS 3.1.1.5, as discussed above in section 2.1.2 relative to Generic Issue 70. The change satisfies the intent of the GL with respect to LTOP, and is, therefore, acceptable to the NRC staff.

The NRC has reviewed the licensee's proposed modifications to the HBR TS. The proposed changes satisfy the intent of GL 90-06, which is to enhance the reliability of PORVs and block valves and provide additional LTOP. The proposed modifications are consistent with GL 90-06, and are otherwise acceptably justified. Therefore, the NRC finds the proposed modifications to the TS to be acceptable.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the State of South Carolina official was notified of the proposed issuance of the amendment. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes the Surveillance Requirements. The NRC has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (60FR 11127). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

5.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

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